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ABSTRACT

Developing prerequisite learning skills and strategies and providing knowledge necessary to further learning in a particular discipline are the dual roles of a middle-grade content-area teacher. This paper demonstrates how these dual roles can support each other in developing readiness for learning. The importance of readiness for learning is discussed, particularly the need for experiential background to be adequate before comprehension can be developed. The two strategies presented, developing vocabulary and student-generated prequestions, reflect the argument that time spent getting ready to read is probably the most effective means of improving comprehension in the content areas. (MB)

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Teaching, Learning, and Reading in the Middle Grade Content Areas

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Improving instruction in the middle-grade content areas would be an easier topic to address if we had available validated theoretical models, and hence an understanding, of 1) how one learns from text, and 2) how intellectual operations develop in adolescence. Our current state of ignorance in these areas has been aptly summarized by Miller (1976) and Neimark (1975) respectively. I am then, like everyone else who would discuss improving comprehension of text in the middle grades, reduced to drawing upon the available body of literature and from this attempting to produce a framework from which useful strategies can be developed.

We really know very little about learning in humans, particularly the complex sort found in content area instruction. We do know that readiness for learning is in itself a complex interaction of a variety of diverse factors including physiological and psychological maturity, motivation, mastery of prerequisite skills, etc. (Watson, 1964). This concept, readiness for learning, is of vital importance to improved content area instruction, particularly in the middle grades and thus shall be a primary focus of this paper. It is in the middle grades that the content area teacher has the distinctive and unique responsibility of developing effective application, utilization, and extension of reading abilities in content area texts (Allington, 1975). That is, the middle-grade teacher's role is one of producing students who know how to learn from printed material, thus attempting to ensure mastery of some of the most

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important prerequisite abilities for later learning. The middle-grade content area teacher then has a dual role; developing prerequisite learning skills and strategies, while simultaneously providing knowledge prerequisite to further learning in a particular discipline. It is this duality that complicates content area teaching in the middle grades. This duality is noted because too often the middle-grade content area teacher has been trained only to provide the latter type of instruction. In this paper both are acknowledged and explored with an attempt to demonstrate how these dual roles can be mutually supportive particularly in developing readiness for learning.

Goals and instruction.

Content area teaching is typically purposeful, as is much of the learning fostered, as opposed to incidental. For this purposeful teaching to occur, however, there must be goals for teaching; goals which go beyond the vague generalities and professional sounding platitudes too often associated with the various disciplines. I will not go as far as some and advocate goals which meet strict behavioral criteria, but for a variety of reasons the content area teacher must know what is to be taught and what is to be learned.

These goals have to reflect the dual role of the middle-grade content area teacher. The content specific concepts, processes, functions, or relationships to be developed must, of course, be identified but additionally the particular learning strategy to be developed, applied, or refined must also be identified. The middle-grade content area lesson must not only produce content relevant learning but also provide the learner with skills and strategies for learning from text.

Instructional goals should also be precise enough to allow the teacher to justify each assignment in relation to them. For instance, the content area should ask, "Why am I assigning page 33 to be read?". Is there information on that page that has been identified as important? Can a particular strategy for learning from text be employed? Or is it assigned because it follows page 32 and precedes page 34? Many pages in every content area text have nothing worth remembering, nor are any important concepts, processes, functions, or relationships presented. I would argue that assigning these pages because they fall between more relevant material is justifiable, but only as long as the teacher is aware that the rationale is one of maintaining textual continuity. This rationale then cues the teacher that no test item should be drawn from that page. Students should not be tested on material simply because it is there. Test items must be related to the goals set by the teacher.

This may seem blatently obvious but I still visit content area classrooms which are totally text dominated. The teacher seems to have no goals--save one--to get through the text. (Many will recognize this as the Vince Lombardi theory of learning, that is the goal is to cover the ground.) Now simply getting through a text may indeed be a justifiable goal economically, and even politically, but it cannot be supported educationally. The teacher who adopts this position assumes no real responsibility for teaching, seldom setting any educational goals and more often than not simply has students reading, listening, and remembering. Every page is page 33 and assessments are constructed with randomly selected statements from the text. Any statement, regardless of significance, may be turned into a test item (What was the tune the British band played when Cornwallis surrendered to Washington at Yorktown?).

Without rather clearly formulated goals the content area teacher has little guidance for developing either instruction or assessment. Formulation of goals must precede instruction even in the most eclectic teaching environment. Both types of goals, content specific and generalizable learning strategies, should also be represented on the assessment. The type and level of assessment employed is a powerful shaping factor for student learning. If assessments do not relate to the goals then the student, particularly the brighter ones, adopt a strategy which relates to success on the assessment. Assessments which require only remembering of minute details, for instance, focus student attention on these rather than on acquiring an understanding of the concepts, functions, processes, and relationships presented.

This leads us to another facet of goals, instruction, and assessment in content areas; remembering does not equal understanding. This is noted because goals sometimes become lists of data to be memorized, at least until the test (consider for a moment all of the facts we have forgotten from classes in which grades of A were earned). I am at this point quite sure that remembering what one reads, for instance, is not itself a valid indicator of understanding, or comprehension. A rather simple demonstration of the validity of this contention will be found by reading the accompanying paragraph entitled "The CRT" and then completing the test items. Few teachers ever have difficulty correctly answering at least 70% of the items, even when the passage is removed after reading. Few though can describe a CRT (though most have had a direct experience with one). Simple questions on size, material, color, etc., cannot be answered. Likewise virtually none can answer the final question beyond simply regurgitating the statements from

the passage. Thus while most readers are able to recognize all of the words and even remember much of the information, few ever comprehend what they have read, or understand the function of a CRT. This brings us to a crucial issue yet to be resolved. If comprehension is to be defined as an increase in information (Bormuth, 1969), then the performance on the CRT test is a demonstration of comprehension. However, it should be fairly obvious that little understanding has been generated. Remembering is not necessarily either comprehending or understanding. Only if the new information can be organized into or associated with the previously known will understanding, or comprehension, take place.

How much learning in the content areas is of this type? Simple remembering of factual information but no assimilation, or cognitive reorganization? Do we really have as goals remembering whether Ben Franklin signed the Declaration of Independence? Or how many miles Lee advanced into Pennsylvania? Or the capitol of Oregon? Or the major river in Brazil? Each of the above were drawn from social studies tests and by turning the items around we get what seem to be quite arbitrary and menial goals for learning. Similar examples abound in other content areas as well and these seem to suggest either goals that reflect rather low level expectations or test items discrepant from the original instructional goals.

Thus far remembering as an instructional goal has been criticized in relation to the content area skills role of the middle-grade teacher. However, similar criticism can be leveled in relation to the other role, that of developing learning skills. Factual recall is a necessary learning skill to be sure, but it is far from the most important or most powerful, particularly if recall goes no further than that found in the CRT task. Middle-grade students need

to learn a variety of text processing skills particularly; assessing the value of information, identifying relationships, rapid identification of information relevant to a specific purpose, etc. A continual emphasis on recall of information leads to rote learning in content areas, students who can list exports without understanding their function in the economy, students who can solve $\underline{x}$ but do not understand the underlying mathematical processes, students who can list the genus and species of an organism without discovering the interrelationships of living things.

Goals are necessary for teaching. They do not have to be narrow or even measurable in the behavioral sense, but they do alert the teacher as to where instruction is going. They are even more useful for deciding whether one has reached the planned destination. However, goals for teaching are not enough, one must attempt to meet the goals with effective instruction and that is another point at which content area instruction at times breaks down.

From my standpoint what is called teaching in some content area classrooms is too often only testing or telling. To support this contention let me present two brief scenarios which one can observe in virtually any school on any day. In the first, the teacher simply assigns pages to be read with no further guidance and follows this with a test covering the material assigned. Or the teacher may simply use class time to question students on the assigned material. In the second scenario the teacher tells students a number of pieces of information and then also follows with a formal test or perhaps with the in-class questions. Both of these scenarios recur endlessly in the schooling process, and seem plausible methods for ensuring students have read assignments or attended to the lecture, but we need to examine whether either is truly teaching.

If the teacher simply writes "Read pg. 108-123" on the chalkboard and then later assesses student knowledge of this material, then it would seem that instruction has not occurred, neither has telling really, for though a general area has been identified to be read, the teacher has not specified what is to be learned (unless one assumes everything contained on pages 108-123 is to be learned). Now suppose the student fails these tests. Has the teaching failed? Perhaps it failed by omission but in the strictest sense teaching cannot be evaluated. How then should the failure be construed? If no teaching has occurred, what type of inadequacy is indicated?

It could be that the student has not read the assigned material. Or perhaps could not read the material. It is also possible the student completed the assignment but did not have adequate experiences, or previous knowledge, to fully assimilate all the concepts presented. Then again the student may have completed the assignment and understood the material but failed to retain the specific information presented on the test. The point is, the student failed the test but without a teaching component it is difficult to assess the relevance of this behavior.

The student has failed to demonstrate the necessary independent learning skills and strategies, but we have identified the development of these as one of the two primary goals of the middle-grades content area teacher. The student has also seemingly failed to acquire the knowledge base one would consider prerequisite for further learning in the discipline, the other primary goal of middle-grade content area instruction.

Rather than continuing to beat this dead horse, let me summarize here by noting that in neither of the above scenarios did the teacher develop either of the primary prerequisites; strategies or knowledge. These examples point out a major deficiency in content area instruction; too often aptitude and achievement is assessed without an instructional component. The learner has instruction in neither the development or refinement of processing skills and strategies nor in the development of an understanding of the concepts, processes, functions, or relationships presented in the text. At this point the teacher is only maintaining the status quo; those students who have the abilities or knowledge achieve, the others do not.

Developing strategies for learning from text.

There seems to be three points at which learning from text may be hindered (Golinkoff, 1976; Elkind, 1975). The first and most widely acknowledged, and indeed probably overemphasized, is a lack of sufficient decoding ability. Either ineffective or effective but inefficient abilities here seem to be detrimental to learning. However, the development of these abilities is not a primary responsibility of a content area teacher. The content area teacher may provide incidental instruction when introducing technical vocabulary, for instance, but the development of these abilities is one area of clear differentiation of roles between reading teachers and content area teachers. In other words, content area teachers may have to adjust instruction or instructional materials to meet the needs of students with severe decoding deficiences but the development of these abilities is primarily the responsibility of the reading teacher.

A second point at which learning from text can be disrupted is the meaning of single printed words. The results of several recent experiments (Pace and Golinkoff, 1976; Golinkoff and Rosinski, 1976) indicate that poor comprehenders have no inherent lack of understanding of many words but rather access to meaning is at times disrupted by inefficient decoding processes. However, poor readers and below average achievers often do have deficits in vocabulary, particularly in technical vocabularies common to content area instruction (Petty, Herold, and Stoll, 1968). Additionally, the poorer student is unlikely to benefit from contextual information (Rankin and Overholser, 1969). The content area teacher can provide instruction to overcome these hindrances while maintaining an orientation to both primary goals. That is, by using selected strategies the teacher can first develop word meanings that will serve as prerequisite knowledge for later learning and also provide instruction in use of contextual information to give meaning to a new word.

However, it is at the third point of interference, organization of textual information, that the content area teacher can probably provide the most profitable instruction. Poor comprehenders seem to lack, or at least are deficient in developing, an organizational framework for retention of information from textual material (Cromer, 1970; Levin, 1972). There are several ways that an organizational strategy might be imposed but the most appealing are those which train the poor comprehender in self-generated organizational strategies (Allington, 1975). Particularly appealing is the student-generated questioning described by Duffy et al (1973) and Gould and Chodos (1976). Despite the paucity of research, this approach, described below, is theoretically defensible.

It has been suggested that a) learners progress only as far as is necessary to achieve their purposes and b) participation increases motivation (Watson, 1964). Similarly Frank Smith (1975) defines comprehension as having your cognitive questions answered, while Gagne and Briggs (1974) argue that "the most important pre-requisite for the learning of new information is the provision of a meaningful context within which the newly learned information can be subsumed, or with which it can be in some meaningful way associated." Along the same line Rothkopf (1970) has suggested that questions which identify categories into which information can be organized will facilitate learning. However, his research and that of a variety of others (Levin, 1972; Andrews, 1972; Frase, 1967; Bull and Dizney, 1973; Richard, 1976) has focused more on teacher generated, or externally imposed organizational frameworks. While useful in meeting the goal of mastery of knowledge prerequisites there is less than convincing evidence available that students adopt and internalize these organizational techniques. As suggested earlier, the most useful instruction is that which develops in the student self-generated organizational strategies since the end result is a more independent learner, a primary goal of middle-grade instruction.

Two areas then in which the content area teacher can focus efforts profitably might be the full and rich development of concepts, functions, processes, and relationships which are represented by the technical vocabulary of the content areas and the development of student generated organizational strategies, particularly student produced pre-questions. The development of an understanding of the technical vocabulary is necessary for readiness for learning since, as Preston (1969) and Elkind (1975) noted, words do not <u>have</u>

meanings nor do persons get meanings from a word. Rather it is the person who gives meaning to words and it can be given only in terms of an individual's experiences, whether real, vicarious, or abstract. Student generated pre-questions assist in setting some purpose for reading, a prerequisite to learning (Gibson, 1973). They should also increase what Elkind (1975) labels "receptive discipline", or attention and active self-monitoring. The student becomes a searcher, actively attempting to construct meaning as text is processed.

Developing technical vocabulary.

Given that meaning is not inherent words but, rather, has to be supplied by the learner from his experience, developing vocabulary, or meaning, will involve at experience at some level. The problem for the content area teacher is two-fold; identification of key vocabulary and selecting the appropriate level of experience.

Selecting the key vocabulary, the target words, depends on the goals set by the teacher. Any content area unit typically has a large number of new words which might be selected. However, the teacher must decide which relate most directly to the goals of instruction and proceed to develop an understanding of these. Not every new word can be presented, nor should it have to be. Care should be taken though to ensure an appropriate key vocabulary is selected. This typically is not difficult for the content area teacher who has decided which concepts, functions, processes, and relationships are to be developed since a word is simply the graphic representation of these. For instance, the word photosynthesis is only the graphic representation of a process. Developing an understanding of the word simultaneously develops an understanding of

the process, the word and the process are inseparable.

Once the key vocabulary have been identified the teacher must select the type of experience to be provided. The range of experience runs from direct to abstract. That is, one can directly experience some phenomena, such as the Aurora borealis, erosion, a butte, etc. Other phenomena can be experienced only vicariously or abstractly. For instance, jet stream, discrimination, heat transfer, etc. are phenomena which can be presented at these levels in the classroom. Dale (1969) provided what he called a "cone of experiences" in which he attempted to rank each of fourteen types of experiences from most abstract to direct. His model has visual and verbal symbolic representations (reading and talking) as the most abstract, and hence least effective types of experiences. Pictures, movies and models are examples of vicarious levels that rank between the abstract and the direct experience. The decision that the teacher must make is one of effectiveness versus efficiency and practicability. Direct experiences cannot be provided for all key vocabulary even though that might be the most effective. Using the glossary is efficient but generally less than effective. The compromise then is most often for a vicarious experience.

Let's return to the CRT passage again for a moment. The single word which is the key to understanding is CRT. Without a previous knowledge of the term understanding is virtually impossible. The failure to comprehend lies not in a word recognition deficit nor at this point in a organizational deficiency. Rather prerequisite knowledge is lacking thus disrupting assimilation, active evaluation, and construction of meaning. At the verbal abstract level of experience a CRT might be discussed and the words cathode ray tube

presented as the fuller representation of CRT. However, this typically does not facilitate comprehension, it only adds another undefined term. At the visual symbolic abstract level one might go to a dictionary and find that the definition of a cathode ray tube is: a vacuum tube in which cathode rays are projected on a flucrescent screen. Again this abstract level of experience seldom proves useful in facilitating comprehension. A primary difficulty with the visual symbolic level (e.g. dictionary, glossary, in text definitions) is the level of previous knowledge required. These definitions, or experiences, are often circular and thus unclear to anyone who has little previous background.

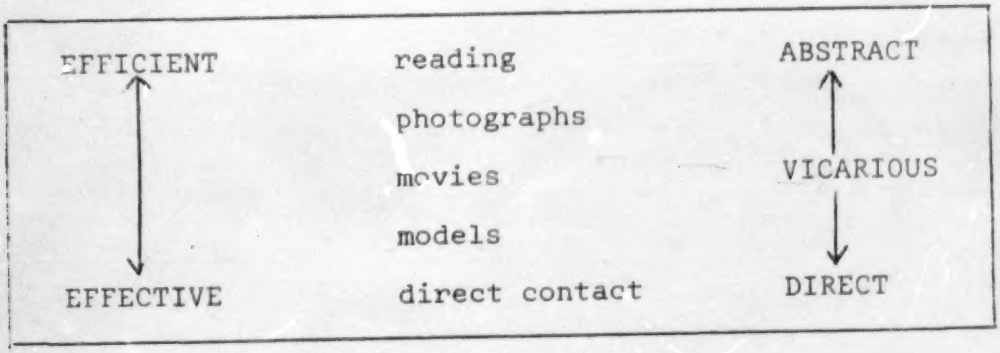
Ideally a vicarious level experience would be produced at this point but I am limited in this paper to visual symbolic experience. A picture or a film of a CRT in action would probably cue each reader as to what a CRT is and allow some active construction of meaning of the passage. However, I must attempt to draw on your experience to develop the representation of the physical object.

A CRT can be likened to a television, it is of approximately the same size, shape and general appearance. However a CRT screen typically shows printed material and cannot present television shows. Two common uses of a CRT are at airline reservation desks and in banks. Those little television-like monitors which displays arrival schedules, ticket information, bank account balance, etc., are CRT's. Often the print is of a green hue and the orthography is characterized as computer orthography. If the reader has not yet developed an understanding, that is matched the label to something in the experience background, then I can only suggest a visit to an airport or a bank and ask to see a CRT. This direct experience is probably the most

effective mode for producing recognition of a CRT, which is incidentally but one level of understanding. Only after the recognition phase, however, can we move on to attempting to develop higher levels of understanding such as the functions a CRT might perform in a classroom.

In each content area the key vocabulary needs to be developed for understanding and, in fact, understanding these items may be the most crucial aspect of content area teaching. The teacher should consider the various levels of experience presented in the figure belowand select the level that matches the depth of understanding suggested in the goals. Abstract concepts such as justice, bias, prejudice, can be also taught on these varying levels as well. While the teacher may not wish to present direct experience with bias or prejudice, a simulation (a vicarious experience) can more effectively develop understanding than a simple reading of a definition.

An understanding of vocabulary is fundamental for comprehension. If one seeks to develop readiness for learning effective instruction in vocabulary will have to be considered. This instruction fulfills both goals of the middle-grade content area teacher; it improves text processing and builds the knowledge base necessary for further study in the discipline. The teacher who attempts to provide the most effective experiences will at the same time be developing the prerequisites to understanding. Vicarious experiences are probably the most practical for the content area teacher but any move away from a reliance upon visual symbolic representations of experience will benefit the learner.



Student generated prequestions.

Comprehension of text is typically viewed as an active processing model. The passive reader seldom retains or assimilates information presented. Consider Watson's (1964) notions that learning proceeds as far as is necessary to meet the goals established and that participation increases motivation. Student generated prequestions then would seem to both produce goals and increase readiness. However, training students to become effective at developing questions prior to reading is not an easy task.

A first step is to ensure that students have an adequate store of experiences to generate items from. For instance if you had been provided with an opportunity to develop prequestions for the CRT passage the first item would have been: What is a CRT? Once that is known more specific items can be constructed. Similarly in the content areas one may find that without preparation for a new unit the students are terribly ineffective and inefficient at generating items prior to reading. Even with some previous knowledge, however, many students are initially poor at producing prequestions.

One technique, described by Duffy, et al (1973), supplies the student with key vocabulary items. The selected words are presented to the students on the chalkboard. For instance, for a unit on

Egypt one might select words such as pyramid, pharoah, mummified. The teacher begins by asking students if they are familiar with any of the words. Following response by students, the teacher then asks if students can think of any questions relating to those words. As children respond (with a leader question from teacher if necessary) the teacher writes each question on the board. Vocabulary in certain questions may lead to further queries. This procedure continues until no further questions are posed. The teacher then directs the students to read the passage and find as many answers as possible. Thus, with a set of goals developed for reading, students silently read the selection. Adaptations of this technique include supplying students with "teaser" sentences from which questions might be elicited, directing students to skim through the unit of study looking at pictures and headings to develop questions. The strategy employed by Gould and Chodos (1976) was to supply a brief overview and ask students to generate items. With either strategy it might be beneficial to begin with a group presentation of the technique preceded by some modelling of the activity by the teacher. As students become more adept at generating items have each work individually or in small groups. Periodically review the student's efforts and provide more modelling of the behavior if necessary.

The function of the prequestion is to provide the learner with some purpose for reading. If adequate background experience exists and if the student has developed effective prequestioning strategies then comprehension of text is facilitated. Prequestions provide a basis for actively processing information presented. Only when an active search for constructing meaning is present can comprehension ensue.

Summary.

More attention, it has been argued, is typically given to the content of instruction than to developing effective and efficient learning strategies. If the unique dual role of the middle-grade teacher is to be fulfilled then the development of both content specific knowledge and the more generalizable learning strategies must be considered in preparing and delivering content area instruction. The importance of readiness for learning was discussed, particularly the need for adequate experiential background before comprehension can be developed. The two strategies presented, developing vocabulary and student generated prequestions, both reflect the argument that time spent getting ready to read is probably the most effective means of improving comprehension in the content areas (Robinson, 1975).

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FIGURE A

THE CRT

A CRT is a handy device. Of course, it cannot function without a central processing unit. The portable models need only a telephone pick-up to work. However, the most common access device is similar to an electric typewriter. With this combination a person can examine stored information prior to requesting hardcopy. It also allows a user to confirm input.

There are many uses for a CRT. Some models key mechancial responses such as opening valves, locks, etc. Of course direct mechanical manipulation requires a light sensitive model. These models are also useful in schools. The most common function is to present drill and practice exercises. However, due to the expense only about 1 percent of all classrooms have a CRT. Most experts predict that the CRT will become more common in schools. Some say it will replace the workbooks of today.

Answer True or False:

1. A CRT is a handy machine. _____
2. A CRT needs a central processing unit. _____
3. There are portable CRT models. _____
4. A CRT allows a user to confirm input. _____
5. A CRT has a single use. _____
6. Most classrooms have at least one CRT. _____

Select the best answer:

7. The most common access device for a CRT is...
   a. a John Deere tractor b. a CRT c. an electric typewriter
   d. none
8. CRT's are found in what percentage of classrooms?
   a. .1 percent b. 1 percent c. 10 percent d. 100 percent
9. The CRT allows a user to examine information prior to...
   a. hand copy b. impress c. input d. hardcopy
10. Most experts predict that the CRT...
    a. will become common in schools.
    b. fad will die out.
    c. producers will market a color model.
    d. will eliminate human teachers.

Write a short answer to the following questions:

1. Describe in some detail how a CRT would be useful in your classroom.